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Abstract

SOME REGULARITIES OF THE DISTRIBUTION AND MIGRATION OF RADIOACTIVE ELEMENTS IN THE SOIL STRATUM

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The study of the contents and distribution of natural radio-isotopes and their radioactive decay products with different chemical properties created in soils, and the infiltration into the soil of artificial radio-isotopes (strontium - 90, cezium - 137, etc.) with atmospheric precipitation, due to nuclear testing and peaceful uses of atomic energy, in conditions of natural stratification of soil, is of great scientific and practical interest.

A large amount of factual material on the contents of natural and artificial radioisotopes in the upper layer of the soil covering has been already accumulated. There have been no investigations insofar, on distribution of them among the genetic horizons of soils in various landforms and only a few amount of data on radiometric determinations of natural radioelements and penetration of large quantities of artificial radioactive isotopes into the soil was available.

The aim of this work is the study of the contents and distribution of natural radioelements and radioactive strontium in various types of soil in conjugate landforms, which play a considerable role in the distribution of chemical elements over the terrestrial surface.

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The following results hage been obtained in the course of research carried out:

1. The content of natural radioelements in soils of the USSR (excluding abnormal areas) varies from 4.10^{-6} to 16.10^{-4} per cent for thorium , from 1.10^{-12} to $1.7 \cdot 10^{-10}$ per cent, for radium from 3.10^{-6} up to 5.10^{-4} per cent for uranium.

The variation of contents in the seat, soil-forming,and ledge rocks does not exceed one order of the value.

In the soils investigated, the relation Th: U is 0.3 to 4.8.

2. The highest level of radioactivity is found in soddy-- bog, alluvial clay-bearing soils of river bottom-lands (Th= 15.10^{-4} per cent; U = $4.8.10^{-4}$ per cent), the minimum level is found in sandy soils particularly in peat upland bogs (Th= (4 to 8) . 10^{-6} per cent;U=(2.4 to 6.6).10^{-6} per cent).

3. The differentiation of radio-elements in some types of soils (chernozem, grey forest, some of the soddy-podzolic soils) over the profile is not considerable.

Accumulation of radio-elements, is observed, as a rule, in alluvial, gleisol and sometimes in carbonate horizons of various types of soils.

4. Distribution of radio-active elements which have entered from the atmosphere in the soil stratum, depends considerably on locality conditions.

5. Radiostrontium accumulates mainly in soils in areas located near bottom lands and boggy depressions. The degree of accumulation depends on the specific features of the bottom lands.

6. The vertical distribution of strontium - 90 depends on the type of soil, the structure and composition of the surface horizon and on some other factors.